



# DET NORSKE VERITAS

## TYPE APPROVAL CERTIFICATE

CERTIFICATE NO. P-13633

This is to certify that the  
**Flexible Hoses of Non-Metallic Material with Permanently Fitted Couplings**

with type designation(s)  
**AVENGER T1A/T3KA, SURVIVOR RQP1, DIEHARD T1D/T3KD, ADVANTAGE DF1E, ADVANTAGE T1E, T1F-Fire  
suppression**

Manufactured by  
**RYCO Hydraulics Pty. Ltd.**  
**FOOTSCRAY VICTORIA, Australia**

is found to comply with  
Det Norske Veritas' Rules for Classification of Ships  
Det Norske Veritas' Standards for Certification 2.9 No. 5-791.70

Application  
May be used for: **Water based hydraulics , pneumatic systems (see cert.), fresh water, sanitary, hydraulic oil, fuel oil  
and lube oil systems.**

Temperature range:	-40°C to 150°C (see cert.)
Max. working press.:	65 bar to 225 bar (dep. on size and type, see cert.)
Sizes:	DN6 - DN50, 1/4" - 2" (see cert.)

Høvik, 2011-02-07  
for Det Norske Veritas AS

  
Marianne Spæren  
Head of Section



DNV local office:  
Melbourne

This Certificate is valid until  
2014-12-31

  
Øyvind Skåra  
Surveyor

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid.  
The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.  
If any person suffers loss or damage which is proved to have been caused by any negligent act or omission of Det Norske Veritas, then Det Norske Veritas shall pay compensation to such person for his proved direct loss or damage. However, the compensation shall not exceed an amount equal to ten times the fee charged for the service in question, provided that the maximum compensation shall never exceed USD 2 million. In this provision "Det Norske Veritas" shall mean the Foundation Det Norske Veritas as well as all its subsidiaries, directors, officers, employees, agents and any other acting on behalf of Det Norske Veritas.



Certificate No.: P-13633  
File No.: 791.70  
Job Id.: 262.1-010711-1

## Product description

Flexible rubber hoses with permanently attached couplings.

### Materials:

Inner tube: Oil resistant synthetic rubber

Reinforcement: 1 wire braid acc. to SAE 100R1.

Cover: Oil and weather resistant rubber.

End couplings: Carbon steel AISI/SAE 12L14, electroplated Fe/Zn12c acc. to AS1789

T3K10D to T3K16D and T3K10A to T3K16A have 2 wire braids reinforcement.

Rubber hoses for SURVIVOR are produced by Diesse Rubber S.p.A.

Rubber hoses for AVENGER and DIEHARD are produced by RYCO Hydraulics SDN BHD.

End couplings are produced by RYCO Hydraulics.

DF1E, T1E and T1F are to be used for temperatures -40°C to +100°C

## Application/Limitation

This certificate is valid for the specific assembly of hose and coupling type as specified, assembled and delivered by the holder (named as manufacturer) of this certificate.

All hose assemblies delivered under this type approval certificate shall be in compliance with an assembly procedure issued by the certificate holder.

Hose assemblies delivered from the certificate holder shall be delivered with the following documentation:

The hose assemblies covered by this type approval may be assembled and delivered by other than the certificate holder under the conditions as described in DNV type approval programme 5-791.70.

Each hose assembly is before delivery to be hydraulic pressure tested to 1.5 times the working pressure, and delivered with the manufacturer's/assemblers pressure test report and CoC (certificate of compliance) with reference to this Type Approval Certificate.

Hoses used for continuous operation at temperatures higher than 100°C will have their lifetime reduced. In such cases more frequent inspections and planned exchange should be a part of the maintenance program.

Flexible hoses are only to be used in lengths up to 2 meters where it is necessary due to vibrations or flexible mounting of the machinery. The hoses shall not replace/be used where permanent piping is possible/required.

The hoses must only be fitted in places where they are always accessible.

Flexible hoses of these types are not to be used on boiler fronts.

The hoses are to be mounted in accordance with the manufacturer's instructions.

It must be possible to shut off from the system all flexible hoses used in systems for compressed air, lube oil, fuel oil and petroleum base hydraulic oil.

Hose assemblies with couplings made of carbon steel are not to be used at temperatures below -10°C unless the material is normalized.

For use with compressed air or gases, the cover of the hose has to be pricked.

The hoses may be used for hydraulic systems with the following max. allowable working pressures:



Certificate No.: P-13633  
 File No.: 791.70  
 Job Id.: 262.1-010711-1

SURVIVOR RQP1	Hose size ID		Max. pressure		Couplings			
	Inches	mm	psi	bar	Insert	Ferrule	Bitelok	
RQP14	1/4"	6	3,250	225	600 series	K00-04	T200	
RPQ15	5/16"	8	3,120	215			T200	
RQP16	3/8"	10	2,600	180	600 series	K00-06	T200	T700
RQP18	1/2"	12	2,300	160	600 series	K00-08	T200	T700
RQP110	5/8"	16	1,890	130	600 series	K00-10	T200	T700
RQP112	3/4"	20	1,740	120	600 series	K00-12	T200	T700
RQP116	1"	25	1,300	90	600 series	K00-16	T200	T700

AVENGER T1A	Hose size ID		Max. pressure		Couplings			
	Inches	mm	Psi	bar	Insert	Ferrule	Bitelok	
T13A	3/16"	5	3,600	250			T200	
T14A	1/4"	6	3,250	225	600 series	K00-04	T200	
T15A	5/16"	8	3,120	215			T200	
T16A	3/8"	10	2,600	180	600 series	K00-06	T200	T700
T18A	1/2"	12	2,300	160	600 series	K00-08	T200	T700
T110A	5/8"	16	1,900	130	600 series	K00-10	T200	T700
T112A	3/4"	20	1,500	105	600 series	K00-12	T200	T700
T116A	1"	25	1,300	90	600 series	K00-16	T200	T700
T120A	1 1/4"	32	945	65	600 series	A00-20	T200	T700
T124A	1 1/2"	40	725	50	600 series	A00-24		T700
T132A	2"	50	580	40	600 series	A00-32		T700

AVENGER T3KA	Hose size ID		Max. pressure		Couplings	
	Inches	mm	Psi	bar	12000 series	Bitelok
T3K4A	1/4"	6	3,050	210	12000-04	T200
T3K5A	5/16"	8	3,050	210	12000-05	T200
T3K6A	3/8"	10	3,050	210	12000-06	T200
T3K8A	1/2"	12	3,050	210	12000-08	T200
T3K10A	5/8"	16	3,050	210	12000-10	T200
T3K12A	3/4"	20	3,050	210	12000-12	T200
T3K16A	1"	25	3,050	210	12000-16	T200

DIEHARD T1D	Hose size ID		Max. pressure		Couplings			
	Inches	mm	Psi	bar	Insert	Ferrule	Bitelok	
T14D	1/4"	6	3,250	225	600 series	K00-04	T200	
T15D	5/16"	8	3,100	215			T200	
T16D	3/8"	10	2,600	180	600 series	K00-06	T200	T700
T18D	1/2"	12	2,300	160	600 series	K00-08	T200	T700
T110D	5/8"	16	1,900	130	600 series	K00-10	T200	T700
T112D	3/4"	20	1,500	105	600 series	K00-12	T200	T700
T116D	1"	25	1,300	90	600 series	K00-16	T200	T700
T120D	1 1/4"	32	945	65	600 series	A00-20	T200	T700
T124D	1 1/2"	40	725	50	600 series	A00-24		T700
T132D	2"	50	580	40	600 series	A00-32		T700

DIEHARD T3KD	Hose size ID		Max. pressure		Couplings	
	Inches	mm	Psi	bar	12000 series	Bitelok
T3K4D	1/4"	6	3,050	210	12000-04	T200
T3K5D	5/16"	8	3,050	210	12000-05	T200
T3K6D	3/8"	10	3,050	210	12000-06	T200
T3K8D	1/2"	12	3,050	210	12000-08	T200
T3K10D	5/8"	16	3,050	210	12000-10	T200
T3K12D	3/4"	20	3,050	210	12000-12	T200
T3K16D	1"	25	3,050	210	12000-16	T200



Certificate No.: P-13633  
 File No.: 791.70  
 Job Id.: 262.1-010711-1

DF1E	Hose size ID		Max. pressure		Couplings	
	Inches	mm	Psi	bar	12000 series	Bitelok
DF14E	1/4"	6	3250	225	12000-04	T200
DF15E	5/16"	8	3100	215	12000-05	T200
DF16E	3/8"	10	2600	180	12000-06	T200
DF18E	1/2"	12	2300	160	12000-08	T200

T1E	Hose size ID		Max. pressure		Couplings	
	Inches	mm	Psi	bar	12000 series	Bitelok
T13E	3/16"	5	3600	250	12000-03	T200
T14E	1/4"	6	3250	225	12000-04	T200
T15E	5/16"	8	3100	215	12000-05	T200
T16E	3/8"	10	2600	180	12000-06	T200
T18E	1/2"	12	2300	160	12000-08	T200
T110E	5/8"	16	1900	130	12000-10	T200
T112E	3/4"	20	1500	105	12000-12	T200

T1F	Hose size ID		Max. pressure		Couplings	
	Inches	mm	Psi	bar	12000 series	Bitelok
T13F	3/16"	5	3600	250	12000-03	T200
T14F	1/4"	6	3250	225	12000-04	T200
T16F	3/8"	10	2600	180	12000-06	T200
T18F	1/2"	12	2300	160	12000-08	T200
T112F	3/4"	19	1500	102	12000-12	T200

## Type Approval documentation

### Reference documents:

Manufacturers brochure.

Drawing nos.: 701-1616 dated 1992-08-03, CT201-1616 dated 1992-04-13, 4000-16 dated 1992-10-12 and 2000-16 dated 1996-03-22.

Burst Test Cert. Nos.: 1068 dated 1999-09-15, 1071 dated 1999-09-17, 1072 dated 1999-09-20 and 1076 dated 1999-09-23.

Impulse test cert. nos.: 702 dated 1997-05-11, 874 dated 1998-10-16, 877 dated 1998-10-21, 1059 dated 1999-09-14, 1060 dated 1999-09-14, 1064 dated 1999-09-14, 1017 dated 1999-07-06, 1018 dated 1999-07-06 and 1021 dated 1999-07-06.

Material cert. nos.: 2728/99 dated 1999-07-24, 2065/99 dated 1999-04-28, 2728/99 dated 1999-07-24, 2101/99 dated 1999-04-30 and 2092/99 dated 1999-04-30.

Material declarations issued by Phoenix Rubber Products on 1999-07-02, 1999-07-09 and 1999-07-26.

Reference documents for new hose DIEHARD AS1D:

Phoenix Report No. E2100509.

Manufacturer's test reports dated 2010-09-08.

### Fire Test Certificates Numbers:

Hose Type T1A: RH-FT- 01/16/36/

Hose Type RQP1: RH-FT-22/23/24

Hose Type T1D: RH-FT-02, RH-FT-06, RH-FT-07

Hose Type T3KA: RH-FT-63/64/65

Hose Type T3KD: RH-FT-66/67/68

Hose Type DF1E: RH-FT-72/73

Hose Type T1E: RH-FT-77/78/82

DNV Inspection and Testing Report TAR 28913076 dated 2009-04-17 (with attached Test Certificate No. 3089)



Certificate No.: P-13633  
File No.: 791.70  
Job Id.: 262.1-010711-1

### Tests carried out

Dimensional check, Burst, Change in length, Impulse, Cold flexibility, Oil resistance, Ozone resistance, Adhesion, Fire resistance test.

### Marking of product

For traceability to this Type Approval, the hoses are to be marked by an embossed system with:

- Manufacturers logo
- Type designation
- Nominal size
- Quarter and year of production.

### Certificate Retention Survey

For retention of the Type Approval, DNV Surveyor shall perform a survey every second year, to verify that the conditions for the type approval are complied with and to witness the following tests on a selection of sizes:

- Dimensional check.
- Change in length
- Leakage test
- Burst test

The tests shall be performed in accordance with procedures given in Det Norske Veritas' Standard for Certification No. 2.9 – 5-791.70, "Type Approval of Flexible Hoses of Non-Metallic Material".

The tests are to be performed with the type of couplings fitted that are Type Approved with the hoses.